



[http://villains.wikia.com/wiki/File:Vector-\\_Despicable\\_Me.jpg](http://villains.wikia.com/wiki/File:Vector-_Despicable_Me.jpg)

# Vectorized

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# Vectorized Operations

Many operations in R are vectorized making code more efficient, concise, and easier to read.

```
> x <- 1:4; y <- 6:9
```

```
> x + y
```

```
[1] 7 9 11 13
```

```
> x > 2
```

```
[1] FALSE FALSE TRUE TRUE
```

```
> x >= 2
```

```
[1] FALSE TRUE TRUE TRUE
```

```
> y == 8
```

```
[1] FALSE FALSE TRUE FALSE
```

```
> x * y
```

```
[1] 6 14 24 36
```

```
> x / y
```

```
[1] 0.1666667 0.2857143 0.3750000 0.4444444
```

# Vectorized Matrix Operations

```
> x <- matrix(1:4, 2, 2); y <- matrix(rep(10, 4), 2, 2)
```

```
> x * y    ## element-wise multiplication
```

```
  [,1] [,2]
```

```
[1,] 10 30
```

```
[2,] 20 40
```

```
> x / y
```

```
  [,1] [,2]
```

```
[1,] 0.1 0.3
```

```
[2,] 0.2 0.4
```

```
> x %*% y    ## true matrix multiplication
```

```
  [,1] [,2]
```

```
[1,] 40 40
```

```
[2,] 60 60
```